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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/776,645	02/10/2004	Joel Kindem	07402-064001	1750
20985	7590	12/19/2005	EXAMINER	
FISH & RICHARDSON, PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			LEE, SHUN K	
			ART UNIT	PAPER NUMBER
			2884	

DATE MAILED: 12/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/776,645

Applicant(s)

KINDEM ET AL.

Examiner

Shun Lee

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 October 2005.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-47 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-47 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 01 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Specification***

1. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### ***Claim Objections***

2. Claims 17, 19, 22, and 46 are objected to because of the following informalities:

- (a) in claim 17, "at least one of said scintillator materials" on line 2 should probably be --said scintillator material--;
- (b) in claim 19, "the reflector assembly" on line 2 should probably be --said reflector--;
- (c) in claim 22, "at least one air gap" on line 3 should probably be --said at least one air gap--; and
- (d) in claim 46, "radiation to" on line 2 should probably be --scintillation photons back into-- (since the specification discloses (paragraph 4) that "In response to an incident "primary" photon or particle, each scintillator pixel emits secondary "scintillation" photons -from a selected area or areas of the pixel surface area referred to as an exit window or windows. The reflective material at least partially covers the remainder of the scintillator surface area and reflects scintillation photons incident on the covered area back into the scintillator. The term reflector herein denotes either the reflective material itself or the entirety of the reflector material covering the scintillator pixel or scintillator array. The reflector therefore

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increases the light output from the exit window or windows above the output that would occur without the reflector. Reflectors may perform additional functions such as radiation shielding. Use of the reflector for such functions may result in a reduction of light output”).

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-6, 8-12, 14, 15, 17-19, 24, 25, 37-41, and 43-47 are rejected under 35 U.S.C. 102(b) as being anticipated by Such *et al.* (US 2001/0002699).

In regard to claims **1-6, 8-12, 14, 15, 24, and 25**, Such *et al.* disclose (Fig. 2) a scintillator assembly comprising a scintillator material (23) having outer surfaces of a first shape; a preformed reflector (21, 22) having inner surfaces which mate (*i.e.*, press against the outer scintillator material surfaces) with said first shape to contain said scintillator material (23) at least partly within said preformed reflector (21, 22); ridges or protrusions (*i.e.*, spaced apart wire elements; paragraph 9) forming air gaps; at least one of inorganic or organic materials (*e.g.*, TiO<sub>2</sub>; paragraphs 5 and 18) as an additive to the reflector material of the pre-formed reflector (21, 22); one or more openings in the preformed reflector (21, 22) at specified locations, corresponding to specified locations (*e.g.*, exit windows or faces) of the scintillator material (23); and an adhesive material

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(paragraph 18) for bonding said scintillator material (23) within said pre-formed reflector (21, 22), wherein said pre-formed reflector (21, 22) has inner surfaces for containing a plurality of separate units of scintillator material (23), forming a scintillator array (20), and wherein said reflector (21, 22) used to reflect radiation (paragraph 18) to said scintillator material (23).

In regard to claims **17** and **18**, Such *et al.* also disclose (paragraph 13) curved scintillator arrangements. Scintillator materials with non-perpendicular faces and varying cross-sectional areas are inherent in curved scintillator arrangements.

In regard to claim **19**, Such *et al.* also disclose (paragraph 12) press fitting.

In regard to claims **37-41**, **43**, **44**, and **46**, the method steps are implicit for the apparatus of Such *et al.* since the structure is the same as the applicant's apparatus of claims 1-6, 8-12, 14, 15, 24, and 25.

In regard to claim **45** (which is dependent on claim 1) and claim **47** (which is dependent on claim 37), Such *et al.* also disclose (paragraphs 22 and 23) that the wire elements can be arranged and bonded together to eliminate gaps between wire elements and thus the preformed reflector has a plurality of continuous surfaces which extend from a first portion on the scintillator material near a first end thereof, to a second portion on the scintillator material near a second opposite end thereof, and continuously extends between said first and second portions.

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 7, 20-23, 29, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Such *et al.* (US 2001/0002699) in view of DiFilippo (US 6,078,052).

In regard to claim **7** (which is dependent on claim 5), claims **20** and **21** (which are dependent on claim 1), claims **22** and **23** (which are dependent on claim 9), and claim **42** (which is dependent on claim 40), the assembly and method of Such *et al.* lacks a light guide (e.g., a wavelength shifting optical fiber). However, wavelength shifting optical fibers are well known in the art. For example, DiFilippo teaches (column 3, line 21 to column 4, line 8) to provide wavelength shifting optical fibers in order to enhance collection efficiency. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide wavelength shifting optical fibers in the assembly and method of Such *et al.*, in order to enhance collection efficiency.

In regard to claim **29** which is dependent on claim 1, the assembly of *Such et al.* lacks an explicit description of specific reflector fillers or additives (e.g., organic optical brightening agents). However, wavelength shifting is well known in the art. For example, DiFilippo teaches (column 3, line 21 to column 4, line 8) to provide wavelength shifting optical fibers (i.e., organic optical brightening agents) in order to enhance collection efficiency. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide organic optical brightening agents (e.g., wavelength shifting optical fibers) in the assembly of *Such et al.*, in order to enhance collection efficiency.

8. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Such et al.* (US 2001/0002699) in view of *Possin et al.* (US 6,707,046).

In regard to claim **13** which is dependent on claim 1, the assembly of *Such et al.* lacks that at least one pixel has at least one exit window smaller than the area of a face of the pixel upon which each said exit window is defined. However, scintillator exit windows are well known in the art. For example, *Possin et al.* teach (column 5, line 65 to column 6, line 54) to provide scintillator exit windows smaller than the area of a pixel face so as minimize cross talk. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide scintillator exit windows smaller than the area of a pixel face in the assembly of *Such et al.*, in order to minimize cross talk.

9. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Such et al.* (US 2001/0002699) in view of *Hoffman et al.* (US 6,087,665).

In regard to claim **16** which is dependent on claim 1, the assembly of Such *et al.* lacks that the scintillator material comprises different scintillator materials. However, scintillator detectors are well known in the art. For example, Hoffman *et al.* teach (column 4, lines 28-33) to provide different scintillator materials so as optimize specific detector characteristics. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide different scintillator materials in the assembly of Such *et al.*, in order to optimize specific detector characteristics.

10. Claims 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Such *et al.* (US 2001/0002699) in view of Venkataramani *et al.* (US 2002/0181647).

In regard to claims **26** and **27** which are dependent on claim 24, the assembly of Such *et al.* lacks an explicit description of specific reflector fillers or additives (e.g., hafnium or hafnium oxide). However, additives for scintillator reflectors are well known in the art. For example, Venkataramani *et al.* teach (paragraphs 27-31) to provide scintillator reflector additives such as hafnium or hafnium oxide so as to obtain scintillator reflectors having desired x-ray attenuation properties. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide scintillator reflector additives (e.g., hafnium or hafnium oxide) in the assembly of Such *et al.*, in order to obtain a scintillator reflector having desired properties (e.g., attenuation of x-rays).

11. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Such *et al.* (US 2001/0002699) in view of Hoffman (US 6,479,824).



In regard to claim **28** which is dependent on claim 24, the assembly of Such *et al.* lacks an explicit description of specific reflector fillers or additives (e.g., scintillating material). However, additives for scintillator reflectors are well known in the art. For example, Hoffman teaches (column 4, line 55 to column 5, line 2) to provide scintillating material for the reflector fillers or additives so as enhance quantum efficiency. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide scintillator reflector additives (e.g., scintillating material) in the assembly of Such *et al.*, in order to enhance quantum efficiency.

12. Claims 30, 31, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Such *et al.* (US 2001/0002699) in view of O'Kane Sr. *et al.* (US 2002/0060300).

In regard to claim **30** which is dependent on claim 1, the assembly of Such *et al.* lacks an explicit description of that the scintillator reflector (synthetic material; paragraph 17) comprises polyethylene. However, synthetic materials are well known in the art. For example, O'Kane Sr. *et al.* teach (paragraphs 46-49) synthetic materials comprise polyethylene. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention that the scintillator reflector synthetic material in the assembly of Such *et al.* comprise of a known synthetic material (e.g., polyethylene).

In regard to claim **31** which is dependent on claim 30, Such *et al.* is applied as in claim 25 above.

In regard to claim **36** which is dependent on claim 30, Such *et al.* also disclose (paragraph 17) injection molding.

13. Claims 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Such *et al.* (US 2001/0002699) in view of O'Kane Sr. *et al.* (US 2002/0060300) as applied to claim 30 above, and further in view of Venkataramani *et al.* (US 2002/0181647).

In regard to claims **32** and **33** which are dependent on claim 30, Venkataramani *et al.* is applied as in claims 26 and 27 above.

14. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Such *et al.* (US 2001/0002699) in view of O'Kane Sr. *et al.* (US 2002/0060300) as applied to claim 30 above, and further in view of Hoffman (US 6,479,824).

In regard to claim **34** which is dependent on claim 30, Hoffman is applied as in claim 28 above.

15. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Such *et al.* (US 2001/0002699) in view of O'Kane Sr. *et al.* (US 2002/0060300) as applied to claim 30 above, and further in view of DiFilippo (US 6,078,052).

In regard to claim **35** which is dependent on claim 30, DiFilippo is applied as in claim 29 above.

### ***Response to Arguments***

16. Applicant's arguments filed 11 October 2005 have been fully considered but they are not persuasive.

Applicant argues (remarks filed 11 October 2005) that Such *et al.* does not disclose a reflector since the wire elements in Such *et al.* are selected from metals having a high x-ray absorption as described in paragraph 10 of Such *et al.* and cannot

act as reflectors. Examiner respectfully disagrees. Such *et al.* states (paragraph 18) that "The majority of the surfaces of the wire elements will thus reflect; the reflection could be less only at the areas of direct abutment of the wires against the scintillator cubes or elements. When the grid structure itself is coated so as to be reflective or when it is made of a white material, this drawback could be compensated". Thus Such *et al.* expressly teach that the wire elements are reflective.

Applicant also argues (remarks filed 11 October 2005) that Such *et al.* does not disclose bonding the scintillator material. Examiner respectfully disagrees. Such *et al.* states (paragraph 18) that "After the insertion of the scintillator elements, the grid is provided with a white light-reflecting adhesive or lacquer, for example epoxy resin". Thus Such *et al.* expressly teach bonding the scintillator material.

Applicant further argues (remarks filed 11 October 2005) that Such *et al.* does not disclose an opening in the preformed reflector, at a specified location, corresponding to a specified location on the scintillator material. Examiner respectfully disagrees. Such *et al.* states (paragraph 18) that "Scintillator elements cut or pressed so as to be shaped as small cubes are inserted into the grid openings". Thus Such *et al.* expressly teach an opening in the preformed reflector, at a specified location, corresponding to a specified location on the scintillator material.

### ***Conclusion***

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (571) 272-2439. The examiner can normally be reached on Tuesday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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